degree in the year 1833. His appointment as Instructor of Mathematics to the midshipmen of the United States Navy gave him splendid opportunities for the study of nature in various parts of the world, particularly in France, Italy, and Turkey, opportunities of which he was not slow to avail himself; more especially was his attention attracted to the study of volcanic phenomena by an ascent of Vesuvius, a sight of Stromboli, and an excursion in the Island of Milo in the year 1834. Settling down for a short time, he acted as chemical assistant at Yale College to his old teacher and friend, Prof. Silliman (1836–38); but an opportunity again presenting itself of making a long voyage of marine observation, he accepted the appointment of mineralogist and geologist to the United States exploring expedition, which was to proceed round the world. This expedition, under Charles Wilkes as Commander, was admirably equipped for the objects in view, and consisted of two sloops-of-war, a store-ship, and a brig; the cruise extended over four years (1838–42), and the scientific staff included, in addition to Dana, Pickering, Couthoy, and Peale as zoologists, Rich and Breckenridge as botanists, and Hale as philologist. The memory of the events, scenes and labours of this cruise was a constant joy to him during the remaining fifty-three years of life. On at least two occasions, however, he was in imminent peril: at one time his vessel narrowly escaped destruction on the rocks of Southern Fuegia, when the sea was dashing up the cliffs to a height of two or three hundred feet, and all the anchors had given way; at another time his party had to take to the boats empty-handed, and some hours afterwards they saw the last vestige of the vessel which had been their home for three years disappear beneath the waves.

The study of the material collected by the expedition and the preparation of his reports occupied all the available time during the next thirteen years. The first two or three years were spent at Washington, but after his marriage to the daughter of Prof. Silliman he removed back to New Haven, where he passed the rest of his life. In 1850 he was appointed Silliman Professor of Geology and Natural History at Yale College. In 1846 Mr. Dana had become associate-editor of the *American Journal of Science*, and after the death of Prof. Silliman, in 1864, he became the principal editor of that important scientific organ.

Dana gave special attention to corals and coral islands, and also to volcanoes. The Wilkes expedition of 1838–42 followed in part the course taken by the *Beagle* in 1831–36, and even where it diverged from that route visited coral and volcanic islands such as have been carefully described by Charles Darwin. When the Wilkes expedition reached Sydney in 1839, Dana read in the papers a brief statement of Darwin's theory of the origin of the atoll and barrier forms of reefs; this mere paragraph was a great help to him in his later work, and he afterwards regarded Darwin with feelings of the deepest gratitude. A visit to the Fiji Islands in 1840 brought before him facts such as had been already noticed by Darwin elsewhere; but there they were on a still grander scale and of a more diversified character, thus enabling him to speak even more positively of the theory than Darwin himself had thought it philosophic to do. On other points the conclusions arrived at by Darwin and Dana, independently of each other, were for the most part the same, and differed only in comparatively unimportant details. Dana's special labours relative to corals ceased with the publication of his report on the zoophytes collected by the expedition, but an elaborate account (406 pages) of Corals and Coral Islands was prepared by him and issued in 1879: this was an extension of his expedition-report on Coral Reefs and Coral Islands, which had been separately published in 1853. In 1890 appeared another considerable work (399 pages) entitled "Characteristics of Volcanoes, with contributions of facts and principles from the Hawaiian Islands," which placed on record much useful information collected by him during his travels.

In addition to these larger works, he was the author of about two hundred separate papers. Some of them are of a physical character: his first paper, published as far back as 1833, dealing with the connection of electricity, heat and magnetism; subsequent papers treated of galvano-magnetic apparatus and the laws of cohesive attraction as exemplified by crystals. Other papers, of a purely crystallographic character (1835–52), treated of the drawing and lettering of crystal figures, of crystallographic symbols, and of the formation of twin growths; a series of volcanic papers discussed both lunar and terrestrial volcanoes, the latter including those of Vesuvius, Cotopaxi, Arequipa, Mauna Loa, and Kilauea (1835–68); a set of coral papers treated of the temperature limiting the distribution of corals, on the area of subsidence in the Pacific as indicated by the distribution of coral islands, on the composition of corals and on fossil corals (1843–74).

About forty papers are on mineralogical topics: many of them are descriptive of particular mineral species; others treat of general subjects, such as nomenclature, pseudomorphism, homœomorphism, the connection between crystalline form and chemical constitution, and the origin of the constituent and adventitious minerals of trap and the allied rocks. As illustrations of the variety met with in his geological publications, we may cite his papers on the origin of the grand outline features of the earth, the origin of continents, mountains and prairies, the early condition of the earth's surface, the analogies between the modern igneous rocks and the so-called primary formations, on erosion, on denudation in the Pacific, on terraces, on southern New England during the melting of the great glacier, on the degradation of the rocks of New South Wales, and the formation of valleys. The remaining papers, about seventy in number, deal with biological subjects, both recent and fossil, and have a similarly varied character; some being descriptive of species, others treating of classification and similarly general problems.

The importance of this scientific work was widely recognised, and many marks of distinction were conferred upon him, both at home and abroad. He was an original member of the National Academy of Sciences of the United States, and in the year 1854 occupied the presidential chair of the American Association for the Advancement of Science. In 1851 he was elected a Foreign Member of the Geological Society of London, and in 1872 received from that Society the Wollaston Medal, the highest compliment the Geological Society can pay to the man of science; in the same year the University of Munich honoured him with the degree of Ph.D.; in 1877 he was the recipient of the Copley Medal of the Royal Society, and in 1884 was elected one of the foreign members; in 1886 Harvard conferred upon him the degree of LL.D.; he was also an honorary member of the Academies of Paris, Berlin, Vienna, St. Petersburg and Rome, and of the Mineralogical Societies of England and of France.

NOTES.

With the École Normale at Paris, which has just celebrated its centenary, the names of a number of distinguished men of science are associated. At the present time, no less than twelve of its old students are members of the Academy of Sciences. Pasteur left Lille to become the director of scientific studies at the school, and carried on, while in connection with it, the researches which have made his name known throughout the world. M. Bertrand, the Perpetual Secretary of the Academy, is an old student of the school, and among other eminent names included in the list of its alumni are MM. Darboux, Joubert, Serret, Hermite, Puiseux, Briot, Bouquet, Giard, Baillaud, Chaive, Floquet, Pellet, Tisserand, Appell, Picard, &c.; while the teaching staff now contains such men as Goursat, Tannery, Gernez, Dufet, Houssay, Constantin, Raffy, Violle, Joly, and Wallerant.

AN influential committee has been formed for the erection of a monument to the late Prof. Hermann von Helmholtz, the German Emperor having promised 10,000 marks and a free site for the purpose. The committee is international and thoroughly representative, as shown by the names of Berthelot, Blaserna, Boltzmann, Geikie, Holmgren, Kékulé, Kelvin, Lippmann, Lubbock, Pictet, Rayleigh, Roscoe, Sidgwick, Siemens, Tait, Thalén, Virchow, Weber, and others among the 180 distinguished men of science forming the committee. Funds will be collected in Germany and in other countries, and may be sent to any member of the committee, or to Messrs. Mendelssohn and Co., Berlin W., Jaegerstrasse 49 and 50. Letters may be sent to Prof. Dr. A. König, Berlin N.W., Flemmingstrasse 1. The appeal issued by the committee concludes as follows: "Friends and admirers of Hermann von Helmholtz, far and near, unite with us! Bear witness to the homage paid by science, which knows no frontiers, to one of its heroes; show your gratitude for the benefits which life has received from his scientific labours, and give expression to the love which his harmonious spirit won wherever he appeared."

PROF. HUXLEY'S condition during the past week has caused his friends considerable anxiety, but we are glad to learn that a change for the better set in on Monday.

DR. JOHN H. REDFIELD, one of the founders of the American Association for the Advancement of Science, died recently at Philadelphia.

THE Prince of Wales has signified his intention to be present at the celebration of the jubilee of the Royal Agricultural College, Cirencester, on July 25.

THE sixty-seventh meeting of the Society of German Naturalists and Physicians will be held this year at Lübeck, September 16 to 21. The secretaries of the zoological section are already making preparations for this event, and will issue a preliminary programme of communications and demonstrations early in July.

THE London Geological Field Class will commence their series of Saturday afternoon excursions, under the direction of Prof. H. G. Seeley, F.R.S., next Saturday, when they will visit Otford and Eynsford. Further particulars can be obtained from the General Secretary, R. Herbert Bentley, 31, Adolphus Road, Brownswood Park, N.

MR. EDWARD CROSSLEY has signified his intention of presenting to the Lick Observatory the 3-foot reflecting telescope, with its dome, which now form part of his private observatory at Halifax. This information comes to us directly from the Lick Observatory, together with an expression of high appreciation of Mr. Crossley's most generous gift.

APPLICATIONS for appointment to the Medical Research Scholarships of the Grocers' Company must be sent in before the end of this month. The Scholarships are three in number, each of the value of £250, and are open only to British subjects; they were instituted by the Company as an encouragement to exact research into the nature and prevention of important diseases.

AT Stevens's sale room on Tuesday, a fine and well-preserved specimen of the Great Auk, from the collection of the late Sir William Milner, was put up to auction. About eighty skins of the bird are known to be in existence, of which twenty-four are in Great Britain, ten of these being in museums, and fourteen in private hands. The bidding for the specimen offered for sale by Mr. Stevens started at 100 guineas, and went up slowly to 350 guineas; but as this was lower than the reserve price, the bird did not change owners. A Great Auk's egg, offered at the same sale, reached the price of 180 guineas, while an egg of Æpyornis maximus was sold for 36 guineas.

A PARTY, consisting of Dr. Geo. Becker, Prof. W. H. Dall, and Mr. Parington, of the U.S. Geological Survey, will leave Washington on May 16 for Alaska, and will be away until September. Congress recently directed an examination of the gold and coal deposits of the territory to be made, and this will be the work of the party; directed more especially towards an estimate of the economic value of the known deposits, rather than toward a search for new ones.

THE new system—the "Système français"—proposed by the French Société d'Encouragement to regulate the pitch of screws, and the metric wire gauge—the "Jauge décimale métrique"—in which the number of a wire is the same as the diameter expressed in tenths of millimetres, have been adopted in the French Navy by the Minister of Marine. The approva thus officially shown to the new scales will greatly assist the Society in its efforts to establish uniform gauges for wires and screw-threads.

THE news that the office of Superintendent of Agriculture, held by Mr. C. A. Barber in the Leeward Islands, has been abolished, and that the Department of Agriculture, as such, no longer exists, is altogether surprising. The Department was only opened towards the end of 1891, but, under Mr. Barber's direction, the four botanical stations in connection with it, at Antigua, Dominica, St. Kitts, and Montserrat, have done a large amount of work, which is daily becoming more and more known and appreciated. No agricultural community can afford to be without scientific advice in these days of competition and plant disease. Why the local Legislature should dispense with this advice just when the Superintendent of their Department of Agriculture had, by incessant study of the climatal and economic conditions of the islands, attained the position to give it authoritatively, is quite beyond our comprehension.

THE "Exposition annuelle" of the French Physical Society was held last week. Many new and ingenious pieces of apparatus, for use in all branches of physical investigation and instruction, were on view. Electrical instruments occupied a large share of the exhibits, but there were also to be seen new forms of barometers, thermometers, calorimeters, spectroscopes, dynamometers, balances, and other engines of research. M. Violle exhibited photographs of the electric arc, and MM. Loewy and Puiseux showed their lunar photographs obtained at the Paris Observatory. Useful accessories to micrometers for astronomical telescopes were shown by M. Maurice Hamy. There were also on view, among numerous other things, metals of new compounds prepared by M. Moissan in his electric furnace; a radiometer which turned in the opposite direction to that of the ordinary form of the instrument; M. Janssen's long-period meteorograph, designed for the Mont Blanc Observatory; M. Raoul Pictet's apparatus for the experimental study of the critical points of liquids; and the spectrum of argon. Visitors to the Exhibition must have derived considerable benefit from an inspection of the many physical instruments and devices which were to be seen.

MAJOR CARDEW's report on the inquiry which he has made into the circumstances connected with a series of explosions which occurred on February 1, on Southwark Bridge, has just been printed as a Parliamentary Paper. It will be remembered that there were four explosions; the first, and by far the most intense, occurred in the culvert under the pavement and roadway on the west side of the bridge, and it was immediately followed by three explosions in the street boxes of the Electric Lighting Company, on the east side of the bridge. On opening the ground over the culvert, shortly after the explosions, a large crack was found in the 3-inch gas main, out of which the gas was coming in volumes. How the gas was fired could not be exactly ascertained, but Major Cardew confidently asserts that it was not by means of the electric lighting mains. The most striking features about the accident seem to be: (1) The distance to which it appears that a series of explosions may travel along the electric mains which form a gigantic network under the whole of the streets of the city; and (2) the proof it affords of the insufficiency of any ordinary system of ventilation of these pipes and street boxes, if gas can find an easy access to them, and the necessity of exercising great care to make and keep the street boxes impervious to gas. In a former report it was recommended that "accumulation of gas should be prevented by thorough ventilation, by making the sides and bottoms of street boxes impervious to gas, and by filling up the boxes as far as practicable with incombustible material"; to this Major Cardew now adds—"by thoroughly plugging pipes and conduits at each street box to prevent passage of gas along the system," and he puts the filling up the boxes first, as the most simple and certain method of preventing danger of explosion. It is admitted that the main cause of the explosions was the defect in the gas-pipe, and this again directs attention to the very serious danger to the public arising from the condition of the gas-pipes in many districts, and the way in which they are laid and supported; a danger which is continually increasing, owing to the spread of the use of wood paving and other impervious surfaces, and which is temporarily intensified by every severe frost. No want of care on the part of the gas companies can, however, relieve electric lighting companies of the duty of sufficiently protecting their conduits and street boxes against an accumulation of gas, by acting on the recommendations made.

IT is very commonly believed that in Ireland, on account of the mild climate, the Arctic or Mountain Hare does not turn white in winter, but remains in its brown summer fur. Writing in the *Zoologist*, Dr. R. F. Scharff brings evidence that there is no change in the colour of the Irish hare in most winters. But, on the other hand, Major-General Warrand states that—"At Finnebrogue, near Downpatrick, a very large number of hares are taken or killed every year, and it is found that a considerable number of them turn very white in the winter, while nearly all assume a much lighter shade of fur when the cold weather sets in." The editor of the *Zoologist* says that this view is supported by a number of sportsmen and good observers, and that he himself has shot several Irish hares in all stages of change from brown to white.

THERE is an interesting paper in the *Electrician*, by Messrs. Campbell and Lovell, on the supposed magnetic fatigue. Prof. Ewing has recently shown that in the case of good wrought iron, when subjected to very many reversals in weak magnetising fields, there is no perceptible change in the magnetic qualities. The authors have made use of strong magnetising fields, and have experimented on cast as well as wrought iron. The specimens to be tested were in the form of rings wound over with primary and secondary coils. A single **B.H.** curve was taken by the ordinary ballistic method, and then an alternating current of about 1·4 amperes at 83 alternations per second was kept passing through the primary coil for nearly a month. Another series of tests were then made, and it was found that the **B.H.** curve obtained coincided exactly with that given before the repeated reversals, both in the case of wrought and cast iron.

THE current number of *Wiedemann's Annalen* contains a paper, by Herr A. Bock, on the ratio between the lateral contraction and the longitudinal dilatation (Poisson's ratio) in magnetised iron rods. In the method employed the rod under test is rigidly supported at its middle, so that it lies in a horizontal plane. At either end of the rod a cross-piece is attached, as well as a plane mirror. These cross-pieces serve as lever arms, from the ends of which weights can be hung. In this way the bar is both bent and twisted, the amount of bending and twisting being read off by means of a vertical telescope, two scales at right angles, and the mirrors attached to the ends of the rod. The difference of the readings on the scale parallel to the length of the rod (B) is proportional to the bending, while the difference in the readings on the scale at right angles to the length of the rod (T) is proportional to the twist. Then using Kirchhoff's formula, Poisson's ratio is given by $\mu = \frac{T}{B} \cdot \frac{s}{2l} - 1$, where s is the half length of the rod, and l is the length of the lever arm, at the end of which the deforming weight acts. Neither in the case of hard steel or soft iron (a magnetising coil being used in this latter case) was a difference in Young's modulus, or of the torsional rigidity greater than 0·5 per cent. observed. In the case of soft iron, the author considers that his experiments are sufficiently accurate to show that after magnetisation the torsional rigidity and Young's modulus both diminish. Since, however, B diminishes faster than T, the value of Poisson's ratio increases. The author finds that frequent magnetisation and deformation causes the differences in the elastic constants between the magnetised and unmagnetised states to diminish, and he therefore concludes that it is not possible to detect the effect on the elasticity of magnetisation in a rod by the change in the pitch of the note it emits when struck.

THE field experiments now in progress in various parts of the country partake rather of the character of demonstrations than of incursions into the domain of original research. The experiments made in Carnarvonshire last year, in connection with the agricultural department of University College, Bangor, included a series in which a mixture of rye grass and clover seeds was pitted against mixtures containing the seeds of other grasses than rye grass, in addition to or exclusive of the latter. The crops were cut in July, and weighed green, when the crop containing clovers and rye grass only was found to be the heaviest. All the plots are to be grazed for the next three years, and it is obvious that considerable time must be allowed before definite conclusions can be arrived at. Experiments made in Anglesey "to test the best quantity of seed to sow for oats," appear provisionally to demonstrate that four or six bushels of seed (black Tartarian) broad-casted per acre, give better crops than are obtained from eight bushels of seed, the quantity sown under the usual practice of the island. In both counties comparative manurial experiments are in progress upon pasture land and field crops.

THE work of the Aberdeenshire Agricultural Research Association in 1894 was largely concerned with an inquiry into "degeneration of rye grass and possible recovery." It is argued that, in permanent pasture, "starvation of plants, and non-utilisation of the plants when grown, are the features to be remedied, in order to secure permanent pasture of the valued rye grass." The supreme value of *Lolium perenne* in pastures, as demonstrated by Sir John Lawes and others a few years ago, appears to be steadily acquiring additional confirmation in different parts of the country, and the economic importance of the question is beyond all doubt. We are afraid that confusion is likely to arise from the adoption of a practice in vogue at some of the American experiment stations, where the word "legume" is used to denote "leguminous (papilionaceous) plant." In this report we read, "Legumes (*i.e.* tares, peas, clover, lucerne, &c.)." The word "legume" has already a definite meaning attached to it by English botanists, whilst in colloquial use in France it has another and a wider application. Exception should also be taken to the use of the term tubercules (or tubercles) to denote the structures on the roots of leguminous plants. Lawes and Gilbert have, with admirable consistency, adhered throughout to the word "nodules," and it is unfortunate that this example has not generally been followed. Students of agriculture are hearing more and more of tubercle in animals, and of the disease termed tuberculosis, and there is a tendency, at least on the part of beginners, to think that all tubercles must be alike. The general adoption of the word "nodules," as used by Lawes and Gilbert, would lessen the possibility of confusion.

MISS CHRISTINE LADD FRANKLIN publishes an interesting paper on "The Normal Defect of Vision in the Fovea" in the current number of the *Psychological Review*. Recent investigations of Königs on the relative absorption of different portions of the spectrum by the visual purple, the curve of which corresponds with the curve which expresses the distribution of brightness along the spectrum for (1) the totally colour-blind and (2) the normal eye in a faint light, suggest that vision both in (1) and (2) is conditioned by the presence of visual purple in the retina. But this visual purple is absent in the fovea. If this be so, the eye in (1) and (2) should be blind in that part of the retina. Careful observations and experiments were made to test the validity of this conclusion. "The blindness of the fovea for faint light did not at once reveal itself; the act of fixation means holding the eye so that an image falls on the part of the retina best adapted for seeing it, and hence it would involve keeping the image *out of* the fovea in a faint light, if the fovea were then really blind. But after the total disappearance of the small bright object looked at had several times occurred by accident, it became possible to execute the motion of the eye necessary to secure it at pleasure. It was then found that the simple device of presenting a group of small bright objects to the eye of the observer was sufficient to demonstrate the 'normal night-blindness of the fovea' without any difficulty—one or other of them is sure to fall into the dark hole of the fovea by accident." Observations on a totally colour-blind boy showed the blindness of his fovea. The function of the retinal purple is, it is suggested, for the reinforcement of waning light, and is especially adapted for the absorption of the faint green light of dense forests.

THE Calendar of Queen's College, Galway, for 1894–95, has just been published, and also that of the Royal University of Ireland, for the year 1895.

THE current number of the *Journal* of the Royal Agricultural Society of England contains a long report, by Sir J. B. Lawes, F.R.S., and Sir J. H. Gilbert, F.R.S., on "The Feeding of Animals for the Production of Meat, Milk, and Manure, and for the Exercise of Force."

A NEW edition has been published of "Stephens' Catechism of Practical Agriculture" (W. Blackwood and Sons), revised and largely rewritten by Mr. James Macdonald. The popularity of the book is vouched for by the fact that more than twenty-one thousand copies have been sold.

TWENTY-EIGHT short essays by Dr. Jean Rey, "On an inquiry into the cause wherefore tin and lead increase in weight on calcination," form the contents of No. 11 of the Alembic Club Reprints. The essays, which originally appeared in 1630, are interesting because they contain descriptions of experiments and results which anticipated, to some extent, the work done by Lavoisier a century and a half later.

PARTS of the first and second editions of Malthus' essay on the principle of population, have been published, in a handy volume, in Messrs. Macmillan's series of Economic Classics, edited by Mr. J. Ashley. Of the first edition, published in 1798, about one-third has been reprinted; but of the second edition, which contained about four times as much matter, the selected chapters are only one-twentieth of the whole work.

AN account of principles and practice of the methods adopted by Dr. T. Schott in the treatment of chronic diseases of the heart by means of mineral baths and exercises, has been written by Dr. Bezly Thorne, and published by Messrs. J. and A. Churchill, together with a description of the Nauheim baths, and of the therapeutic exercises. The volume is full of diagrams and other illustrations of interest to students of cardiac affections.

A GERMAN edition of Mr. Benjamin Kidd's "Social Evolution," with a preface by Dr. A. Weismann, has just been published by Gustav Fischer, Jena.

FIVE new volumes belonging to the "Encyclopédie scientifique des Aide-Mémoire" have come to us from the joint publishers, Gauthier-Villars and G. Masson, Paris. They are: "Le Fonctionnement des Machines à Vapeur," by G. Leloutre; "Des Marées," by P. Hatt; "Balistique des Nouvelles Poudres," by E. Vallier; "La Théorie des Procédés Photographiques," by A. de la Baume Pluvinel; and "La Distillation," by E. Sorel.

INDEXES to the literature of cerium and lanthanum, by Dr. W. G. Magee, have been published together as No. 971 of the "Smithsonian Miscellaneous Collections," in accordance with the recommendation of the Chemical Literature Committee of the American Association for the Advancement of Science. The difficulty and labour involved in the preparation of these indexes can only be fully understood by those who have attempted similar tasks. All chemists should be grateful to Dr. Magee for his very valuable bibliography.

A FULL notice of the life and numerous works of the late Mr. F. Buchanan White appears, with a portrait, in the April number of the *Annals of Scottish Natural History*. A report on the remarkable visitation of the Little Auk to Scotland, during the past winter, is contributed to the same number by Mr. W. E. Clarke. The whole of the records of occurrences of the bird from December 22, 1894, to February, are shown upon a map which accompanies the report, and are also precisely tabulated in chronological sequence.

DR. HENRY MAUDSLEY'S "Pathology of Mind" (Macmillan) has recently been published in such an altered and enlarged form, that it is virtually a new book, "for," to quote from the preface, "while old matter has been left out, and much fresh matter added, the whole [has been recast, the form of the presentation changed, and the text entirely rewritten." The present contents of the work, as expressed by the new subtitle, constitute a study of the distempers, deformities, and disorders of the mind.

IN the third *Bulletin* of the Madras Government Museum appears a revised edition of Mr. Edgar Thurston's "Rámésvaram Island and the Fauna of the Gulf of Manaar." The situation of Ràmésvaram, on the reef which, under the name of Adam's Bridge, almost connects Ceylon with the mainland of India, renders an account of its flora and fauna particularly interesting; and the present brochure, which is illustrated with several charts and photographs of the coast, furnishes a useful supplement to Haeckel's graphic pages upon the island of Ceylon. The observations recorded are admitted to be far from exhaustive of the biological features of the Gulf of Manaar, but they are more than sufficient to indicate the existence of a fauna well worthy of further examination.

THE Malacological Society of London, instituted for the study of the Mollusca and Brachiopoda, only came into existence in February 1893, but its performances up to now give every promise of a successful future. It publishes *Proceedings*, in which appear anatomical papers, and papers devoted to descriptions of recent and fossil shells. A valuable address by Dr. H. Woodward, F.R.S., dealing largely with scientific investigations of the sea and its inhabitants, appears in the fourth number of the Society's *Proceedings*, with a number of other papers. In this connection we notice that the *Journal of Malacology* contains a contribution, by Dr. J. C. Thresh, on "Oysters as Disseminators of Disease," and, together with several other communications and a bibliography of recent literature, an interesting note, by Mr. W. M. Webb, on "The Dimyarian Stage of the Native Oyster."

THE Natural History Societies in our public schools probably do more to foster scientific research than all the systematic instruction in lecture-room and laboratory; therefore every encouragement should be given to the work of observation and collection which is carried on by them. Increased demands of both school work and games on half-holidays leave little time to cultivate interest in natural things, and this accounts partly for the statement in the report of the Rugby School Natural History Society for 1894, that the interest shown in the Society by members of the school has decreased. Possibly, now that the new museum is completed, and the collections in it are being systematically arranged by Mr. Collinge, the Society will commence a new era of prosperity.

THE Danish Meteorological Institute and the Deutsche Seewarte have conjointly published daily synoptic weather charts of the North Atlantic Ocean and adjacent continents for a year ending November 1889. These valuable charts were first issued for September 1873 by the late Captain Hoffmeyer, of Copenhagen, and they afford excellent materials for tracing the connection between the weather conditions of the Atlantic, this country, and Western Europe. For some years past the charts have been accompanied by explanatory text, which greatly enhances their value. The discussion of the charts for the year in question is divided into two parts: (1) general investigations of the conditions over the North Atlantic, and (2) application of this knowledge to navigation; while the position and movement of the areas of high and low barometer, in interesting cases, are shown in forty special charts accompanying the text.

SEVERAL aromatic esters of arsenious acid have been prepared for the first time by Dr. Fromm, of Rostock. The new substances are either viscous liquids or crystalline solids, and are prepared with considerable facility. The first member of the series, the triphenyl ester, $As(OC_6H_5)_3$, is obtained by allowing arsenic trichloride diluted with ether to fall drop by drop into sodium phenylate suspended in ether. The reaction commences vigorously at the ordinary temperature, but the mixture eventually requires warming over a water bath in order to obtain the theoretical yield. The ethereal liquid is then allowed to stand until the finely-divided precipitate of common salt subsides, when it is decanted from the latter. The ether is then removed by distillation over the water bath, and the thick residual liquid subsequently subjected to distillation under reduced pressure. Arsenious triphenyl ester is a colourless viscous liquid endowed with an odour somewhat resembling that of phenol; it boils under a pressure of 57 m.m. at 275°. The liquid is remarkably sensitive to moisture, for water instantly decomposes it into arsenious oxide and phenol. Halogens do not form additive compounds with it, but chlorine and bromine convert it into arsenic trichloride or tribromide and trichlor- or tribromphenol. The second member, the para cresyl ester, $As(OC_6H_4CH_3)_3$, is similarly obtained, and is likewise an oily liquid, boiling at 290° under 20 m.m. pressure, and endowed with similar properties. The benzyl ester, $As(OCH_2C_6H_5)_3$, has also been isolated in an analogous manner, but is not quite so stable as the two esters just described, being more or less decomposed upon distillation *in vacuo;* it may be obtained practically pure, however, by heating the product of the reaction in an oil bath to 200° under low pressure. It reacts with water similarly to the two other esters. In addition to these liquid aromatic arsenious esters, the β-naphthyl ester, $As(OC_{10}H_7)_3$, has been prepared by the action of arsenic trichloride upon the sodium derivative of β-naphthol. As the sodium compound is in this case completely soluble in ether, the arsenic chloride reacts with great energy. The arsenious naphthol ester crystallises from the ethereal solution after decantation from the precipitated common salt, in colourless aggregated crystals, which melt at 113°–114°, and are readily soluble in alcohol and benzene in addition to ether. Water immediately decomposes them, and in boiling water the products of the decomposition, arsenious oxide and β-naphthol, dissolve completely.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*, ♀) from West Africa, presented by Miss Florence Greffin; a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by Mr. R. J. Davidson; two Polar Hares (*Lepus glacialis*) from Norway, presented by Mr. O. Gude; a Common Badger (*Meles taxus*) from Berkshire, presented by The Duke of Wellington; an Irish Stoat (*Putorius hibernicus*) from Ireland, presented by Viscount Powerscourt; two Antipodes Island Parrakeets (*Cyanorhamphus unicolor*) from Antipodes Island, New Zealand, presented respectively by Sir Walter L. Buller, K.C.M.G., and Mr. William E. Collins; two Scarlet Tanagers (*Ramphocœlus brasilius*) from Brazil, presented by Mr. Robert E. Graves; a Red and Blue Macaw (*Ara macao*) from South America, deposited; two Griffon Vultures (*Gyps fulvus*) from Egypt, purchased; an Egyptian Gazelle (*Gazella dorcas*, ♂) from Egypt, received in exchange; a Great Kangaroo (*Macropus giganteus*, ♂), a Rufous Rat Kangaroo (*Hypsiprymnus rufescens*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE VARIABLE STAR Z HERCULIS.—This recently discovered variable star turns out to be one of exceptional interest. It was first suspected of variability by the Potsdam observers, and subsequent observations by Chandler and Hartwig seemed to show that it was a star of the Algol type. Early in the present year Dr. Dunér announced that the new variable was probably of the Y Cygni type with unequally bright components, since he found unequal minima alternating in periods of forty-seven and forty-nine hours. Returning to the subject (*Astrophysical Journal*, April), Dr. Dunér gives the data on which his conclusion was based, and derives some interesting results as to the probable constitution of the system. The normal magnitude of the star is 6·89; at principal minimum it falls to 8·05, and at secondary minimum to 7·35. Hence,